



Programme Matrix: Bachelor of Science – Biotechnology, Genetics [2023 Batch]

Programme Outcomes

After successful completion of B.Sc. Honours in Biotechnology / Genetics, a student will be able to:

PO1: integrate scientific temper and spirit of enquiry

PO2: apply scientific knowledge and skills ethically for societal development and entrepreneurship

PO3: demonstrate / apply interdisciplinary knowledge and skill in biotechnology

PO4: use biotechnological practices in addressing the current and future food, health and environment needs

PO5: interpret genetic and biomolecular processes of inheritance, development, mutation, genetic change, plant and animal physiological processes, and epigenetics

PO6: apply genetic concepts in identifying issues related to health, food and environmental sustainability.

PO7: design and execute ethical research in biological sciences

Date of Approval: 10/2/2023

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FACULTY OF SCIENCE
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I Semester			
Course Type	Course Code	Course Title	Course Outcomes
DSC	21BTG2T411	Cell Biology	<ol style="list-style-type: none"> 1. Explain the structure of Prokaryotic and eukaryotic cells, functions of the cell and the fundamentals of microscopy 2. Review the structural and functional organization of cell organelles 3. Appraise the mechanisms of cell motility 4. Relate to the mechanism of cell division and programmed cell death 5. Appraise the mechanism of cell signaling.
DSC	21BTG2L211	Cell Biology Practical	<ol style="list-style-type: none"> 1. Explain the structure of Prokaryotic and eukaryotic cells, functions of the cell and the fundamentals of microscopy 2. Review the structural and functional organization of cell organelles 3. Appraise the mechanisms of cell motility 4. Relate to the mechanism of cell division and programmed cell death 5. Appraise the mechanism of cell signaling.
DSC	21GEN2T411	Principles of Genetics	<ol style="list-style-type: none"> 1. Outline Mendel's experimental design and familiarize with classical genetic terminologies 2. Describe Mendel's principles of segregation, independent assortment and genetic outcomes utilizing branch diagrams and Punnett squares 3. Interpret various types of gene interactions 4. Comprehend the significance of multiple factor inheritance 5. Summarize chromosomal, hormonal and environmental modes of sex determination.
DSC	21GEN2L211	Principles of Genetics Practical	<ol style="list-style-type: none"> 1. Understand the handling of microscopes and lifecycles of model organisms 2. Demonstrate the method of Drosophila culture and human blood grouping 3. Identify and correlate the presence of Barr body and drumsticks in females 4. Perform genetic crosses and solve problems on multiple alleles, gene interaction and polygenes.
AECC	22ENG1T312	Musings in English Literature	<ol style="list-style-type: none"> 1. Articulate the relevant issues of society through the imbibed knowledge of prose 2. Identify and appreciate nuances of poetry 3. Implement the basic concepts of grammar and its usage.
AECC	21KAN1T312	Saahithya Sangama I	<ul style="list-style-type: none"> • ಸಾಹಿತ್ಯದಲ್ಲಿ ಅಡಗಿರುವ ವಿವಿಧ ಸಾಮಾಜಿಕ ಮೌಲ್ಯ ಮತ್ತು ಜವಾಬ್ದಾರಿಗಳನ್ನು ಅರಿಯುವರು. • ಭಾಷಾ ಕೌಶಲವನ್ನು ಅಭಿವೃದ್ಧಿ ಪಡಿಸಿಕೊಳ್ಳುವರು. • ವಿದ್ಯಾರ್ಥಿಗಳು ತಮ್ಮ ಜೀವನದ ಸೃಜನಶೀಲತೆಯ ಮಹತ್ವವನ್ನು ಚರ್ಚಿಸುವರು. • ಹದಿಹರೆಯ ವಯಸ್ಸಿನ ಸಮಸ್ಯೆಗಳು ಹಾಗೂ ಪರಿಹಾರಗಳನ್ನು ವಿಶ್ಲೇಷಿಸುವರು. • ಜೀವನದಲ್ಲಿ ಮಾನವ ಪಡೆಯಬೇಕಾದ ಯಶಸ್ಸಿನ ಹಾದಿಯನ್ನು ವಿವರಿಸುವರು.

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AECC	21HINIT312	Hindi Kahani aur Prayajanmulak Hindi	1: हिन्दी कहानी विधा का ज्ञान ग्रहण करने की क्षमता का विकास। 2: विद्यार्थियों में सामाजिक यथार्थ और मुल्यांकन करने का विकास। 3: विद्यार्थियों में कहानी विधा का वर्णन करने की क्षमता का विकास। 4: विद्यार्थियों में कहानी का विश्लेषण और भाषा कौशल में प्रवीणता।
AECC	22AENIT311	Listening and Comprehension in English	1. Identify the barriers to listening and describe the key components that contribute to effective listening 2. Use their grammatical knowledge to refine their speech and writing 3. Analyse complex human situations and challenges that emerge from the prescribed texts

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II Semester			
Course Type	Course Code	Course Title	Course Outcomes
DSC	21BTG2T421	Microbiology and Microbial Techniques	<ol style="list-style-type: none"> 1. Explain the fundamentals of microscopy and staining used in microbiology 2. Appraise the essential concepts of sterilization techniques 3. Decipher the various culture techniques 4. Review the different antimicrobial agents.
DSC	21BTG2L221	Microbiology and Microbial Techniques Practical	<ol style="list-style-type: none"> 1. Demonstrate safety measures, instrumentation and sterilization methods in a Microbiology laboratory 2. Formulate media for the isolation, culture and enumeration of microorganisms 3. Perform fundamental staining techniques and biochemical tests for the identification of bacteria and fungi.
DSC	21GEN2T421	Cell Structure and Dynamics	<ol style="list-style-type: none"> 1. Appraise properties of cells and principles of microscopy 2. Summarize the ultrastructure of prokaryotic cell and cell motility 3. Illustrate the ultrastructure of eukaryotic cell, structure and function of organelles 4. Appraise the mechanism of biogenesis of Mitochondria, Chloroplast, Endoplasmic Reticulum and Golgi Complex 5. Describe the stages in cell cycle, cell division and mechanism of programmed cell death
DSC	21GEN2L221	Cell Structure and Dynamics Practical	<ol style="list-style-type: none"> 1. Execute differential staining of Paramecium and Yeast 2. Perform temporary slide preparation and identification of stages of mitosis and meiosis using onion flower buds 3. Understand the calculation of numerical aperture 4. Demonstrate the experiment to isolate chloroplast.
AECC	22ENG1T322	Glimpses: Readings from English Literature	<ol style="list-style-type: none"> 1. Identify the themes and relevant issues through the study of prose and poetry 2. Develop the skill to identify the pertinent themes and characters in the novel 3. Implement new approaches in speaking and writing skills.
AECC	21KANIT322	Saahithya Sangama II	<ol style="list-style-type: none"> 1: ಸಾಹಿತ್ಯದಲ್ಲಿ ವ್ಯಕ್ತವಾಗಿರುವ ಮಾನವೀಯ ಮೌಲ್ಯಗಳನ್ನು ಅರಿಯುವರು 2: ಸಾಹಿತ್ಯದಲ್ಲಿ ಅಡಗಿರುವ ಸಾಮಾಜಿಕ ಮೌಲ್ಯಗಳನ್ನು ಅರಿಯುವರು. 3: ಯುದ್ಧದಿಂದಾಗುವ ಅನಾಹುತಗಳನ್ನು ಅರಿಯುವರು. 4: ಮಾನವಿಲ್ಲದ ಜಾತಿ ಭೇದಭಾವಗಳ ಬಗ್ಗೆ ಅರಿಯುವರು. 5: ಜೀವನ ಕೌಶಲವನ್ನು ಅಭಿವೃದ್ಧಿ ಪಡಿಸಿಕೊಳ್ಳುವರು.
AECC	21HIN1T322	Hindi Kavitha aur Anuvaad Koushal	<ol style="list-style-type: none"> 1: हिन्दी कविता का विश्लेषण एवं समझने की योग्यता का विकास। 2: विद्यार्थियों में सामाजिक यथार्थ और मूल्यांकन करने का विकास। 3: कविता में वर्णित कथा का वर्णन एवं काव्य सृजन करने का विकास। 4: अनुवाद एवं भाषा कौशल में प्राविण्यता।

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AECC	22AENIT321	Conversation Practice in English	<ol style="list-style-type: none">1. Acquaint students with listening skills and grammar.2. Enable students to analyse the prescribed texts based on relevant themes.3. Introduce students to varied genres of writing in English.
AECC	21EVSIT321	Environmental Studies	<ol style="list-style-type: none">1. Understand the concept of Environment and ecosystems2. Gain knowledge on various components controlling the stability of ecosystem3. Understand the Policies and laws pertaining to the welfare of life forms.

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III Semester			
Course Type	Course Code	Course Title	Course Outcomes
DSC	21BTG2T431	Biomolecules	<ol style="list-style-type: none"> 1. Infer the spatial configuration and structural forms of biomolecules 2. Classify carbohydrates, amino acids, lipids, nucleic acids, vitamins and minerals 3. Assess physical and chemical properties of carbohydrates, amino acids and lipids 4. Illustrate the biological importance of biomolecules 5. Explain denaturation, renaturation and packing properties of DNA.
DSC	21BTG2L231	Biomolecules Practical	<ol style="list-style-type: none"> 1. Perform paper; thin layer and column chromatography for separation of analytes 2. Relate the application of Beer- Lamberts law to the operational principle of colorimeter 3. Execute enzyme assay of amylase 4. Execute the extraction, partial purification of proteins and estimate its concentration.
DSC	21GEN2T431	Cytogenetics	<ol style="list-style-type: none"> 1. Outline the organization of eukaryotic chromosome, chromosome ultrastructure and giant chromosomes 2. Describe the concept of linkage and chromosomal non-disjunction 3. Comprehend the mechanism of crossing over and its significance 4. Interpret structural chromosomal aberrations and the consequences 5. Summarize numerical chromosomal aberrations and the consequences.
DSC	21GEN2L231	Cytogenetics Practical	<ol style="list-style-type: none"> 1. Perform mitosis and determine the mitotic index 2. Demonstrate the identification of mutants of Drosophila and C. elegans 3. Perform the dissection of salivary gland and prepare polytene chromosome 4. Execute temporary slide preparation to identify chromosomal translocation in Rhoeo discolor.
AECC	21ENG1T332	Symphony of English Literature	<ol style="list-style-type: none"> 1. Identify the themes and relevant issues through the study of prose and poetry 2. Develop the skill to identify the pertinent themes and characters in the novel 3. Implement new approaches in speaking and writing skills.
AECC	21KANIT332	Saahithya Sangama III	<ol style="list-style-type: none"> 1: ಸಾಹಿತ್ಯದಲ್ಲಿ ಅಡಗಿರುವ ವಿವಿಧ ಸಾಮಾಜಿಕ ಮೌಲ್ಯ ಮತ್ತು ಕವಾಬ್ಯಾರಿಗಳನ್ನು ಅರಿಯುವುದು. 2: ಭಾಷಾ ಶೌಶಲವನ್ನು ಅಭಿವೃದ್ಧಿ ಪಡಿಸಿಕೊಳ್ಳುವುದು. 3: ವಿದ್ಯಾರ್ಥಿಗಳು ತಮ್ಮ ಜೀವನದ ವರ್ತಮಾನದ ಘಟನೆಗಳ ಕುರಿತು ಚರ್ಚಿಸುವುದು. 4: ಹದಿಹರೆಯ ವಯಸ್ಸಿನಲ್ಲಿ ಅರಿಯಬೇಕಾಗಿರುವ ಶಾಂತಿ-ಸೌಹಾರ್ದತೆಯ ಕುರಿತು ವಿಶ್ಲೇಷಿಸುವುದು. 5: ಜೀವನದಲ್ಲಿ ಮಾನವನು ಬೆಳೆಸಿಕೊಳ್ಳಬೇಕಾದ ಬಹುಮುಖ್ಯ ಆದರ್ಶ, ತತ್ವಗಳ ಕುರಿತು ಚರ್ಚಿಸುವುದು.

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AECC	21HIN1T332	Hindi Natak Sahitya aur Sanchar Maadhyam evam Hindi	1:हिन्दी नाटक विधा को समझना और अभिनय करने की योग्यता का विकास। 2:विद्यार्थियों में सामाजिक यथार्थ और मुल्यांकन करने का विकास। 3: नाटक लेखन और पठन में रुचि एवं सृजनात्मक कौशल्य का विकास। 4: संचार माध्यम कला में प्राविण्यता।
AECC	21AEN1T331	Essential English Reading	1. Recognize the techniques of effective reading and demonstrate their competence in comprehension. 2. Articulate their thoughts and structure written compositions as needed in official contexts 3. Formulate their responses to contemporary challenges that emerge from the prescribed texts.

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IV Semester			
Course Type	Course Code	Course Title	Course Outcomes
DSC	21BTG2T441	Molecular Biology	<ol style="list-style-type: none"> 1. Appraise the structure of DNA and concepts of DNA replication 2. Explain the organization of genome and recombination 3. Describe the process of DNA damage and repair mechanisms 4. Summarize the mechanism transcription in prokaryotes and eukaryotes 5. Appraise the mechanisms of protein synthesis and gene regulation
DSC	21BTG2L241	Molecular Biology Practical	<ol style="list-style-type: none"> 1. Adopt a method to isolate and estimate nucleic acids 2. Execute precipitation and estimation of proteins from plant source 3. Detect the mutants induced by physical and chemical agents 4. Analyze the horizontal gene transfer techniques of conjugation and transduction.
DSC	21GEN2T441	Molecular Genetics	<ol style="list-style-type: none"> 1. Appreciate and illustrate the chemical composition of the genetic material and its multiplication 2. Describe the organization of viral, prokaryotic and eukaryotic genomes 3. Explain the process of gene expression in prokaryotes and eukaryotes 4. Explain the concept of transposition, mutation and DNA repair mechanism 5. Appraise the molecular techniques and its applications in diagnostic and research.
DSC	21GEN2L241	Molecular Genetics Practical	<ol style="list-style-type: none"> 1. Understand the working principle and handling of instruments 2. Perform the isolation of DNA from various sources 3. Characterize the eye pigments in Drosophila using paper chromatography 4. Demonstrate the effects of mutation and appraise the applications of molecular markers.
AECC	21ENG1T342	Ruminations of English Literature	<ol style="list-style-type: none"> 1. Articulate the relevant social issues and thematic representation in prose and poetry 2. Analyse the characters, plot, setting and themes of novel 3. Acquire vital employability skills and employment opportunities with in-depth knowledge of writing skills.
AECC	21KAN1T342	Saahithya Sangama IV	<ol style="list-style-type: none"> 1: ಸಾಹಿತ್ಯದಲ್ಲಿ ಅಡಗಿರುವ ವಿವಿಧ ಸಾಮಾಜಿಕ ಮೌಲ್ಯ ಮತ್ತು ಜವಾಬ್ದಾರಿಗಳನ್ನು ಅರಿಯುವರು. 2: ಭಾಷಾ ಕೌಶಲವನ್ನು ಅಭಿವೃದ್ಧಿ ಪಡಿಸಿಕೊಳ್ಳುವರು. 3: ವಿದ್ಯಾರ್ಥಿಗಳು ತಮ್ಮ ಜೀವನದಲ್ಲಿ ಧಾರ್ಮಿಕ ಸಹಿಷ್ಣುತೆಯ ಮಹತ್ವವನ್ನು ಚರ್ಚಿಸುವರು. 4: ಶ್ರೀನಾಮಾನ್ಯನ ಬದುಕಿನ ಸಮಸ್ಯೆಗಳು, ಬವಣೆಗಳು ಹಾಗೂ ಪರಿಹಾರಗಳನ್ನು ವಿಶ್ಲೇಷಿಸುವರು. 5: ದಮನಿತ ಲೋಕದ ಶೋಷಣೆಯ ಬಿನ್ನ ರೂಪಗಳ ಕುರಿತು ಚರ್ಚಿಸುವರು.
AECC	21HIN1T342	Hindi Laghu Upanyas aur Bhasha Ke Vividh Roop	<ol style="list-style-type: none"> 1: हिंदी उपन्यासों का ज्ञान ग्रहण और समझने की योग्यता का विकास। 2: विद्यार्थियों में सामाजिक यथार्थ और मुल्यांकन करने का विकास। 3: लघु उपन्यास की कथा का वर्णन और विश्लेषण करने की क्षमता का विकास। 4: भाषा के विविध रूपों एवं भाषा कौशल में प्राविण्यता।

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AECC	21AENIT341	Fundamentals of English Written Communication	<ol style="list-style-type: none">1. Examine the features of effective writing and demonstrate their skills in complex, non-formulaic writing2. Identify and fix common stylistic errors in written English3. Analyze the representation of cross-cutting issues in literary works.
AECC	21INCIT341	India and Indian Constitution	<ol style="list-style-type: none">1. Evaluate the philosophy of the Constitution and its structure2. Appraise the powers and functions of various offices under the Constitution3. Analyze the Indian values, Ideals and the role of Constitution in a Democracy.

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